Implementing the Ecosystem Approach: the Sustainable River Catchments for the South East (SuRCaSE) project

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Introduction
The importance of water resources and the increasing pressure on them to meet diverse demands for domestic and industrial water supply, recreation and ecological/environmental requirements makes it vital that we learn to manage our water resources more sustainably. This is particularly important as we face the progressive effects of climate change, and the need especially to resolve the conflicting priorities of different stakeholders to allow the needs of society and the economy to be met while preserving the environment. The Water Framework Directive (WFD) now provides an holistic integrated structure within which these challenges can be addressed in a coherent way across the European Community.

The Institute for Sustainable Water, Integrated Management, and Ecosystem Research (SWIMMER) at the University of Liverpool is working in partnership with the South East England Development Agency (SEEDA, one of England’s nine regional development agencies), the Environment Agency, English Nature, Southern Water, Mid Kent Water and the Westcountry Rivers Trust to progress a regional initiative on three pathfinder catchments (Kennet, Darent and Kentish Stour) to test a new integrated approach to water resource management at the catchment scale, using real river basins in the region as pilots. The project is co-funded by the EU LIFE Environment programme, and is expected to be formally launched in spring 2006.

The project is designed to demonstrate the value and practical means of applying the Ecosystem Approach (EsA) to achieve sustainable management of water resources in the South East (SE) of England. The application of the EsA to water resource issues avoids focussing on any single aspect of resource management, but considers instead the wider context necessary to deliver real sustainability. The principles of the EsA can be correlated in many ways to the requirements of the Water Framework Directive, such that projects structured around the EsA can also help to deliver requirements under the Directive, making the principles and insights of the project transferable EU-wide. It will also constitute a demonstration project which has the EsA at its core from the outset, rather than having the approach retrofitted to the project at a later date.

The Project
In a national and European context the water resources of SE England are subject to acute pressures, principally because of the high population density and the low rainfall relative to other UK regions. These pressures are likely to be exacerbated in the future as the effects of climate change become apparent and with the planned increase in household numbers, which makes it a very testing environment to demonstrate the application of the EsA. The UK Climate Impacts Programme predicts a reduction in summer rainfall of 8-23% and increases in winter rainfall of 6-22% in the SE, increasing the pressure on catchments when there is least water availability and increasing the likelihood of disruptive flooding in the winter months.
The recent *Sustainable Communities* strategy document published by the Office of the Deputy Prime Minister (UK Government Office for the South East, 2003) suggests that London and the growth areas in the SE have the capacity to accommodate 200,000 new homes, in addition to those already envisaged in regional planning guidance, which allows for 39,000 new homes per year.

Given these and other growing pressures, it is imperative that the water resources of SE England are managed sustainably and mechanisms that deliver this are put in place as soon as possible. The project described here will implement initiatives in SE catchments to improve the sustainability of water resource management in the region, using three example catchments identified in a scoping study using an EsA framework: the Darent, the Kentish Stour and the Kennet, which represent the range of issues typical of the South East of England. This study was the pathfinder for this project, and identified the gaps in current practice which the project will address. (Maltby et al., 2004).

To demonstrate how the ecosystem approach can be implemented in practice, the project will be carried out at the catchment scale so that the entire hydrological system is considered. The robustness and flexibility of the approach will be tested by implementing the project across three different types of catchment. As catchments form the basic hydrological unit, the spatial scale of this project is sufficient to allow it to demonstrate how similar projects could be implemented in other lowland catchments, of any size, within the UK or elsewhere in Europe. In terms of outputs, the project will be implemented at a scale sufficient to demonstrate the practicability of the approach and achieve meaningful results.

The project will tackle four themes in each of the three catchments that directly relate to the specific objectives of the WFD as well as goals of sustainable development:

- diffuse pollution
- sustainable drainage
- water efficiency and future supply options
- quality of life (through improvements to access and amenity)

These themes will be addressed through a variety of measures that concurrently deliver environmental, social and economic benefits.

**Diffuse pollution**: management plans will be developed for individual landowners, which will, for example, advise on reducing the application of fertilisers and promote best practice in pesticide application and handling. The reduction in application of fertilisers and pesticides delivers both water quality improvements and important cost savings to farmers at a time of relatively low incomes. The establishment of riparian buffer zones will also be encouraged as a mechanism for controlling diffuse pollution. The plans will also include, where appropriate, recommendations for the modification of drainage regimes that restore riparian wetlands, an important mechanism for controlling rapid runoff and pollutants, leading to improved water quality and reduced flooding risk.

**Sustainable drainage**: the impact on water quality and flooding by the proposed extensive development in the region can be ameliorated by the implementation of Sustainable Urban Drainage Systems (SUDS) schemes. Under this task project advisers
will engage developers and local authorities to encourage the adoption of SUDS in the three project catchments. To encourage this project staff will develop the economic and social, as well as environmental, case for SUDS schemes with specific reference to the three project catchments. This will form the basis for information dissemination amongst developers and local authorities, which will tackle the principal barriers to the adoption of SUDS: lack of guidance and technical information, maintenance responsibilities, inertia and evaluation of benefits and costs. The inclusion of urban considerations in this application of the EsA is an important innovative element of this study.

**Water efficiency and future supply options:** Given the balance of water resources in the region, particularly in the Stour and Darent catchments, water efficiency will be an important part of this project. Site-specific water efficiency plans will be developed for industrial operations in the catchments, and for the agricultural sector, water efficiency audits will be delivered in conjunction with the diffuse management plans developed within Theme 1. The project builds on the experience of the project partners working on advisory projects in predominantly agricultural catchments (Maltby & Rickard, 2003; www.wrt.org.uk) but extends it to incorporate the urban dimension that is such a distinctive characteristic of SE catchments. The task will be complemented by in-depth evaluations of future options for demand management, water efficiency, effluent re-use and other major supply improvements as contributors to future provision of sustainable water supplies in SE England.

**Quality of life:** through working with landowners and local authorities, project advisers will encourage increased but sustainable visitor access to the rivers in the project catchments where appropriate and in agreement with the stakeholders. The project will also work towards more sustainable and environmentally sensitive use of existing river-related recreation facilities. Strategies for improved access will be coupled with environmental enhancement to make the corridors more attractive and deliver important biodiversity gains. The innovative elements of this theme within the project are:

- the demonstration of how to incorporate the social dimension of sustainability with the other themes in the context of sustainable integrated catchment management using the EsA
- the development of the process of improving access to the rivers in the catchments as well as the access improvement itself, which has been the focus of other projects. This will allow the network of sites to continue to develop over time, beyond the duration of the project.

**Application of the Ecosystem Approach**

The four themes of the project together address each of the twelve principles of the ecosystem approach. Theme 1 focuses on the decentralisation of management actions to the lowest appropriate level (principle 2), in this case the landowner, incorporating the economic context of management (principle 4) through implementing cost saving measures and the delivery of actions that maintain ecosystem services (principle 5). The implementation of SUDS to deliver improved water quality and flow regime (Theme 2) demonstrates consideration of the effect on adjacent ecosystems (principle 3), consideration of the economic context through internalisation of the environmental costs (principle 4), managing ecosystems within the limits of their functioning (principle 6) and the application of solutions at appropriate spatial scales (principle 7). The specific aligning of incentives to promote sustainable water use (Theme 3)
addresses the consideration of the economic context (principle 3). The future supply option appraisals (part of Theme 3) will be wide-ranging and will take into consideration all the principles as appropriate.

Stakeholder engagement is an important cross-cutting element of this project but is particularly important for Theme 4 (Improved access and amenity). EsA principles recognise that conservation objectives are a matter of societal choice (principle 1), that all forms of knowledge should be taken into account (principle 11) and that all sectors of society should be involved in projects such as this (principle 12). The EsA principles also recognise the systemic and long term nature of natural systems (principles 8 and 9), which is an implicit and cross-cutting theme throughout this project as a core element to sustainable development.

As this project is being applied at the catchment scale it will allow the techniques to be demonstrated so that they can be scaled up to, or transferred to, other catchments. The project catchments have been chosen to reflect the range of impacts present in highly managed systems from relatively low intensity agriculture through high intensity agriculture to urbanisation and, in doing so, address the interactions of the environment with the economy and society. The balance of environmental, social or economic issues is different for the different catchments but the project design allows the emphasis between the tasks to change from catchment to catchment to reflect these differences. It is this feature of this project that would allow it to be transferred to different regions and environments. For instance, greater emphasis may be placed on the diffuse pollution theme in countries like the Netherlands or Belgium where the surplus nitrogen applied to agricultural land is much higher than in the UK (256 kg/ha and 145 kg/ha, respectively, compared with 37 kg/ha in the UK).

Relevance to the Water Framework Directive
The holistic and integrated approach to sustainable water resource management adopted by the project will fill a gap in the current mechanisms for implementing EU legislation and support the work of the statutory organisations working in the three study catchments. It will help them to deliver both their regional objectives and their objectives driven by EU legislation, in particular requirements under the Water Framework Directive, Nitrates Directive, Habitats Directive and the Freshwater Fish Directive.

Water resource management is a Europe-wide problem and the framework provided by this project could be applied elsewhere to help improve the sustainability of water resources throughout the EU. The design of this project has considered the implications of the Water Framework Directive for water resource management and how the project can help to achieve the aims of the Directive, and will contribute to the broad aims of the WFD of sustainable water use, through management at the catchment scale.

At the strategic level, it will contribute to the following specific aims of the directive (Article 1):

• To protect and enhance the status of aquatic ecosystems and, with regard to their water needs, terrestrial ecosystems and wetlands
• To promote sustainable water use
• To mitigate the effects of floods and droughts
Some examples of how the project will support detailed elements of the Directive, linked to the respective EsA principles, include:

**Theme 1 (Diffuse Pollution):**
Principle 2 (Decentralisation): the focus of the project on a catchment-wide basis is well aligned with the strong orientation of the Directive (Art. 3) to a river basin-based management framework.
Principle 4 (Economic context): the project integrates the economic aspects of water resource management at the catchment level, and this harmonises with the emphasis of the Directive at several points (Arts. 5, 9, 11) on the importance of economic analysis and cost recovery in the management of water resources.
Principle 5 (Conservation of ecosystem structure): the project stresses actions which seek to maintain ecosystem structure and services, which is a fundamental theme of the Directive, and is reflected or implicit in several Articles e.g. 1, 4, 16.

**Theme 2 (Sustainable Drainage):**
Principle 3 (Impacts on adjacent ecosystems): this aspect of the project will emphasise the consideration of the impact of urban development on adjacent ecosystems, and reflects the substantive move towards a more deeply integrated ecosystem-based approach to water resources management which the Directive embodies.
Principle 4 (Economic context): see Theme 1, principle 4 above
Principle 6: (Managing ecosystems within the limits of their functioning): this is implicit in the Directive’s ecosystem-based focus, and the need for adaptive management is reflected, for example, in Arts. 4, 5 and 8.
Principle 7 (Application of the EsA at appropriate spatial scales): the catchment-based focus of project themes 1, 2 and 3 strongly incorporates the spatial dimension of water resources management, echoing the implicit emphasis throughout the Directive on management at the appropriate scale.

**Theme 3 (Water efficiency and future supply options):**
Water efficiency: Principle 4 (Economic context): see Theme 1, principle 4
Future supply options: all principles will come into play as appropriate to the particular option being considered, with the Directive as a key over-arching reference framework.

**Theme 4 (Quality of Life):**
Principle 1 (Societal choice): the project will seek to promote active stakeholder engagement and input with respect to increasing the public benefit of access to riparian environments. This together with the intention to take into account all forms of knowledge (principle 11) and involve all sectors of society (principle 12) will harmonise well with the aspirations of Art.14 to encourage the ‘active involvement’ of all interested parties in its implementation.

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